

What is claimed is:

1 1. A method for selecting segments from a corpus of source utterances for
2 synthesizing a target utterance, comprising:

3 searching a graph in which each path through the graph identifies a sequence of
4 segments of the source utterances and a corresponding sequence of unit labels that
5 characterizes a pronunciation of a concatenation of that sequence of segments, each path
6 being associated with a numerical score that characterizes a quality of the sequence of
7 segment;

8 wherein searching the graph includes matching a pronunciation of the target
9 utterance to paths through the graph, and selecting segments for synthesizing the target
10 utterance based on numerical scores of matching paths through the graph.

1 2. The method of claim 1 wherein selecting segments for synthesizing the
2 target utterance includes identifying a path through the graph that matches the
3 pronunciation of the target utterance and selecting the sequence of segments that is
4 identified by the determined path.

1 3. The method of claim 2 wherein determining the path includes determining
2 a best scoring path through the graph.

1 4. The method of claim 3 wherein determining the best scoring path involves
2 using a dynamic programming algorithm.

1 5. The method of claim 2 further comprising concatenating the selected
2 sequence of segments to form a waveform representation of the target utterance.

1 6. The method of claim 1 wherein selecting the segments for synthesizing the
2 target utterance includes determining a plurality of paths through the graph that each
3 matches the representation of the pronunciation of the target utterance.

1 7. The method of claim 6 wherein selecting the segments further includes
2 forming a plurality of sequences of segments, each associated with a different one of the
3 plurality of paths.

1 8. The method of claim 7 wherein selecting the segments further includes
2 selecting one of the sequences of segments based on characteristics of those sequences of
3 segments not determined by the corresponding sequences of unit labels associated with
4 those sequences.

1 9. The method of claim 1 further comprising forming a representation of a
2 plurality of pronunciations of the target utterance, and wherein searching the graph
3 includes matching any of the pronunciations of the target utterance to paths through the
4 graph.

1 10. The method of claim 1 further comprising forming a representation of the
2 pronunciation of the target utterance in terms of alternating unit labels and transitions
3 labels.

1 11. The method of claim 1 wherein the graph includes a first part that encodes
2 a sequence of segments and a corresponding sequence of unit labels for each of the
3 source utterances, and a second part that encodes allowable transitions between segments
4 of different source utterances and encodes a transition score for each of those transitions;
5 and

6 matching the pronunciation of the target utterance to paths through the graph
7 includes considering paths in which each transition between segments of different source
8 utterances identified by that path corresponds to a different subpath of that path that
9 passes through the second part of the graph.

1 12. The method of claim 10, wherein selecting the segments for synthesis
2 includes evaluating a score for each of the considered paths that is based on the transition
3 scores associated with the subpaths through the second part of the graph.

1 13. The method of claim 10 wherein a size of the second part of the graph is
2 substantially independent of a size of the source corpus, and a complexity of matching
3 the pronunciation through the graph grows less than linearly with the size of the corpus.

1 14. The method of claim 1 further comprising:
2 providing the corpus of source utterances, each source utterance being segmented
3 into a sequence of segments, each consecutive pair of segments in a source utterance
4 forming a segment boundary, and each speech segment being associated with a unit label
5 and each segment boundary being associated with a transition label; and
6 forming the graph, including forming a first part of the graph that encodes a
7 sequence of segments and a corresponding sequence of unit labels for each of the source
8 utterances, and forming a second part that encodes allowable transitions between
9 segments of different source utterances and encodes a transition score for each of those
10 transitions.

1 15. The method of claim 14 wherein forming the second part of the graph is
2 performed independently of the utterances in the corpus of source utterances.

1 16. The method of claim 14 further comprising:
2 augmenting the corpus of source utterances with additional utterances; and
3 augmenting the graph including augmenting the first part of the graph to encode
4 the additional utterances, and linking the augmented first part to the second part without
5 modifying the second part based on the additional utterances.

1 17. The method of claim 1 wherein the graph is associated with a finite-state
2 transducer which accepts input symbols that include unit labels and transition labels, and
3 that produces identifiers of segments of the source utterances, and wherein searching the
4 graph is equivalent to composing a finite-state transducer representation of a
5 pronunciation of the target utterance with the finite-state transducer with which the graph
6 is associated.

1 18. Software stored on a computer-readable medium for causing a computer to
2 perform functions comprising selecting segments from a corpus of source utterances for
3 synthesizing a target utterance, wherein selecting the segments comprises:

4 searching a graph in which each path through the graph identifies a sequence of
5 segments of the source utterances and a corresponding sequence of unit labels that
6 characterizes a pronunciation of a concatenation of that sequence of segments, each path
7 being associated with a numerical score that characterizes a quality of the sequence of
8 segment;

9 wherein searching the graph includes matching a pronunciation of the target
10 utterance to paths through the graph, and selecting segments for synthesizing the target
11 utterance based on numerical scores of matching paths through the graph.

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